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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/575,156	04/06/2006	Jouku Savolainen	LOYZ 00004	6845
27885	7590	06/30/2009		
Fay Sharpe LLP 1228 Euclid Avenue, 5th Floor The Halle Building Cleveland, OH 44115			EXAMINER BADR, HAMID R	
			ART UNIT	PAPER NUMBER
			1794	
			MAIL DATE	DELIVERY MODE
			06/30/2009	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/575,156

**Applicant(s)**

SAVOLAINEN, JOUKU

**Examiner**

HAMID R. BADR

**Art Unit**

1794

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 09 April 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-15 and 17-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15, 17-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-893)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_
- Paper No(s)/Mail Date 4/09/2009

**DETAILED ACTION**

Applicants' amendment filed on 4/09/2009 is acknowledged.

All outstanding rejections of record are overcome by applicant's amendment and arguments. New grounds of rejection are set forth below.

Claims 1-15 and 17-20 are being considered on the merits.

***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-15 and 17-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
3. Claim 1 is indefinite for "by forming disulfide bonds between the proteins". It is not clear what is meant by this phrase. Specifically "the proteins" does not clearly indicate which proteins are involved in the disulfide bond formation.
4. Claim 1 is indefinite for "heating said product for 15 minutes". It is not clear what is meant by "said product".
5. Claim 1 is indefinite for "protein space network". It is not clear what is meant by this phrase.
6. Claim 1 is indefinite for "to cause an interchange reaction by said free sulfhydryl groups to form said structure strengthening disulfide bridges between proteins". Since free sulfhydryl groups will be present in the modified protein, as well as in the product to

which the modified protein is added, it is not clear what is meant by the whole phrase. It is not clear whether the disulfide bonds which will be formed later are intermolecular or intramolecular or both.

7. Claim 8 is indefinite for "protective functional properties". It is not clear what is meant by this phrase.

8. Claim 8 is indefinite for "between proteins". It is not clear what is meant by this phrase.

9. Claim 8 is indefinite for "heating said product for 15 minutes or less to cause an interchange reaction by said free sulfhydryl groups to further cleave other disulfide bridges between proteins to obtain free sulfhydryl groups providing said functional properties". It is not clear what is meant by the whole sentence.

10. Claim 11 is indefinite for "protein space network". It is not clear what is meant by this phrase.

11. Claim 14 is indefinite for "to sulfonate said proteins". It is not clear what is meant by "said proteins".

12. Claim 15 is indefinite for "the total protein of the product". It is not clear what is meant by this phrase.

13. Claim 15 is indefinite for "the interchange modification". It is not clear what is meant by this phrase.

14. Claim 18 is indefinite for "protective functional properties". It is not clear what is meant by this phrase.

15. Claim 18 is indefinite for " heating the modified protein and protein containing food product to further cleave other disulfide bonds between proteins during a heating of 15 minutes or less to obtain the protein containing food product having protective functional properties".

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1-15 and 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Savolainen (WO 99/55170; hereinafter R1) in view of Fujimaki et al. (US 4,145,455; hereinafter R2).

2. R1 discloses the modification of whey and soy proteins by sulfonation of one or both of the sulfhydryl groups involved in a disulfide bond. The liberated sulfhydryl groups will make the modified protein more functional regarding emulsification, gelatio—, foaming etc. (page 9, lines 9-16)

3. R1 discloses that free sulfhydryl groups can be about the cleavage of disulfide bonds generating new sulfhydryl groups such that the interaction of the sulfhydryl groups of the modified protein and the new sulfhydryl groups will generate intermolecular disulfide bonds creating protein nets. (page 9, lines 18-22)
4. R1 discloses that the formed sulfhydryl groups can be oxidized using oxidizing agents at temperatures of 45-75°C. (page 9, lines 24-27).
5. R1 discloses the modification of whey proteins and soy proteins by sulfites. (page 10).
6. R1 discloses how the degree of sulfitolysis desired is achieved when whey proteins are modified. (page 11, lines 16-19).
7. While R1 discloses the interaction of the modified protein and other proteins resulting in the formation of new disulfide bonds between two proteins, R1 is silent regarding examples of such interactions.
8. R2 discloses a modified protein composition which is produced by contacting a water soluble protein plant seed protein, cow milk protein etc. with a cysteine enriched plastein. (Abstract).
9. R2 teaches that when modified protein, i.e. cysteine enriched plastein (e.g. from soybean protein), is heated together with soybean protein in an aqueous medium the mixture shows an extremely increased viscosity (Col.1, lines 57-68 and Col. 2, lines 12-15). Given that the sulfhydryl groups in the cysteine enriched protein react with the substrate protein, crosslinkages are formed throughout the protein network and it is

clear that the protein substrate is intrinsically being strengthened and the protein space network causes the viscosity increase.

8. R2 gives a range of proteins which may be used in order to produce the cysteine enriched compositions including milk protein, animal protein, soybean protein, gluten and microbial proteins (Col. 3, lines 1-10).

9. R2 discloses that the sulfhydryl containing protein obtained is contacted with various proteins in an aqueous medium by which the properties of proteins are modified. R1 also discloses that after contacting the proteins with the protein containing sulfhydryl groups, the mixture may be heated under a mild condition for instance 40-90C and further it may be agitated (Col. 4, lines 10-18). Given that the mixture can be heated for desirable effects, it is obvious that the heat treatment time can be optimized by those of skill in the art for the best results.

11. R2 discloses the modified properties of the treated proteins in which viscosity, gelation properties, foaming properties are discussed in detail. Various products are disclosed by R2 including increasing the gel strength in fish paste products, sausages, puddings, soups, promoting the foaming properties of creams, ice creams, and increasing the viscosity of creams, and sauces etc. (Col. 10, lines 54-66).

12. R2 discloses that when the substrate is a heat coagulative protein and the product should be gelled, overheating should be avoided for preventing the undesirable gelation of the product. (Col. 11, lines 7-11). Given the drawbacks of overheating, the optimization of heating treatment regarding the temperature and time is obvious to those of skill in the art.

13. R2 further discloses that the heating and agitation can be carried out during the processing (Col. 11, lines 11-12).

14. On the one hand, while R2 is clearly teaching the role of created sulfhydryl (-SH) groups in crosslinking proteins and the consequence of that crosslinking regarding the improved viscosity, gelling properties and foaming properties of the treated proteins, it is obvious that a protein having free sulfhydryl (-SH) groups can be made by using sulfite as disclosed by R1 and as presently claimed.

15. R1 discloses the details of modifying whey and soy proteins using sulfites and R2 teaches of the reactions of free sulfhydryl groups in functional properties of proteins and the application of modified proteins in various foods. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify whey and soy proteins as disclosed by R1 and incorporate them in other protein containing foods as disclosed by R2. One would do so to alter the functional properties of proteins or the functional properties of foods containing such modified proteins. Absent any evidence to contrary and based on the combined teachings of the cited references, there would be a reasonable expectation of success in preparing the modified proteins and incorporate them into other protein containing foods as presently claimed.

**10. Claims 1-15 and 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Petruccelli et al. (1995, Partial reduction of soy protein isolate disulfide bonds; hereinafter R3) in view of Fujimaki et al. (US 4,145,455; hereinafter R2).**



11. R3 investigates the partial reduction of soy protein isolate disulfide bonds using sodium sulfite. (Abstract)
12. R3 gives the details of reducing the disulfide bonds creating sulfonate groups. R3 discloses that the modified protein has improved functional properties. (Introduction, paragraphs 2-3).
13. R3 discloses how to monitor the degree of reduction of disulfide bonds. (page 2004, col. 1, paragraph 4).
14. While R3 discloses the creation of sulfhydryl groups using sodium sulfite, R3 is silent regarding the incorporation of the modified (reduced) proteins into other protein containing foods.
15. R2 discloses a modified protein composition which is produced by contacting a water soluble protein plant seed protein, cow milk protein etc. with a cysteine enriched plastein. (Abstract).
16. R2 teaches that when modified protein, i.e. cysteine enriched plastein (e.g. from soybean protein), is heated together with soybean protein in an aqueous medium the mixture shows an extremely increased viscosity (Col.1, lines 57-68 and Col. 2, lines 12-15). Given that the sulfhydryl groups in the cysteine enriched protein react with the substrate protein, crosslinkages are formed throughout the protein network and it is clear that the protein substrate is intrinsically being strengthened and the protein space network causes the viscosity increase.

8. R2 gives a range of proteins which may be used in order to produce the cysteine enriched compositions including milk protein, animal protein, soybean protein, gluten and microbial proteins (Col. 3, lines 1-10).

9. R2 discloses that the sulfhydryl containing protein obtained is contacted with various proteins in an aqueous medium by which the properties of proteins are modified. R1 also discloses that after contacting the proteins with the protein containing sulfhydryl groups, the mixture may be heated under a mild condition for instance 40-90C and further it may be agitated (Col. 4, lines 10-18). Given that the mixture can be heated for desirable effects, it is obvious that the heat treatment time can be optimized by those of skill in the art for the best results.

11. R2 discloses the modified properties of the treated proteins in which viscosity, gelation properties, foaming properties are discussed in detail. Various products are disclosed by R2 including increasing the gel strength in fish paste products, sausages, puddings, soups, promoting the foaming properties of creams, ice creams, and increasing the viscosity of creams, and sauces etc. (Col. 10, lines 54-66).

12. R2 discloses that when the substrate is a heat coagulative protein and the product should be gelled, overheating should be avoided for preventing the undesirable gelation of the product. (Col. 11, lines 7-11). Given the drawbacks of overheating, the optimization of heating treatment regarding the temperature and time is obvious to those of skill in the art.

13. R2 further discloses that the heating and agitation can be carried out during the processing (Col. 11, lines 11-12).

14. On the one hand, while R2 is clearly teaching the role of created sulfhydryl (-SH) groups in crosslinking proteins and the consequence of that crosslinking regarding the improved viscosity, gelling properties and foaming properties of the treated proteins, it is obvious that a protein having free sulfhydryl (-SH) groups can be made by using sulfite as disclosed by R1 and as presently claimed.

15. R3 discloses the details of modifying soy proteins using sulfites and R2 teaches of the reactions of free sulfhydryl groups in functional properties of proteins and the application of modified proteins in various foods. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify soy proteins as disclosed by R3 and incorporate them in other protein containing foods as disclosed by R2. One would do so to alter the functional properties of proteins or the functional properties of foods containing such modified proteins. Absent any evidence to the contrary and based on the combined teachings of the cited references, there would be a reasonable expectation of success in preparing the modified proteins and incorporate them into other protein containing foods as presently claimed.

### ***Conclusion***

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US 3,876,805 discloses the modification of whey proteins by reducing compounds such as cysteine and incorporation of the modified whey protein into bread to strengthen the gluten network in the bread.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HAMID R. BADR whose telephone number is (571)270-3455. The examiner can normally be reached on M-F, 8:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Keith Hendricks can be reached on (571) 272-1401. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Hamid R Badr  
Examiner  
Art Unit 1794

/KEITH D. HENDRICKS/

Supervisory Patent Examiner, Art Unit 1794